SUSTAINABLE RANGELANDS ROUNDTABLE (SRR) CRITERION: CONSERVATION & MAINTENANCE OF PLANT AND ANIMAL RESOURCES ON RANGELANDS

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1. INTRODUCTION

In co-ordination with the Sustainable Rangeland Roundtable, members of the Conservation and Maintenance of Plant and Animal Resources on Rangelands criterion group have identified, developed, and adopted 10 Indicators (Table 1) for monitoring plant and animal resource sustainability on rangelands in the United States. The indicators presented below are not inclusive, but provide a suite of variables, that when complemented with variables from other criteria groups (Table 2), produce a viable system to monitor biophysical characteristics indicating trends of sustainable development on rangelands.

Table 1. Indicators for conservation and maintenance of plant and animal resources on rangelands.

Indicator	What the Indicator Describes
1. Extent of land area in rangeland	Over several measurements, changes in total amount of land that fits the definition of rangeland
2. Integrity of natural fire regimes on rangeland	Changes in characteristics associated with natural disturbance of fire: frequency, intensity, extent
3. Extent and condition of riparian systems in rangelands	Condition of riparian vegetation and watershed health
4. Number and extent of wetlands on rangelands	Changes in wetland abundance
5. Rangeland area by vegetation community type	Changes in the area of vegetation community types on rangelands
6. Fragmentation of rangeland by size, pattern, and dispersion of community types	Changes in spatial patterns of vegetation communities on rangelands
7. Density of roads and human structures	Changes in intensity of human use
8. Area of infestation & presence/absence of invasive/non-native plant species	Changes of plant communities that have been invaded by invasive/non-native species
9. Presence & status of species and communities of concern	Changes in species or communities that are threatened, endangered, or of other concern
10. Population levels & geographic range of representative species to be monitored across their known range	Finer scale information such as population levels and current geographic range of select plant and animal species

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Table 2. Five criterion groups selected by the Sustainable Rangeland Roundtable.

1. Maintenance of Productive Capacity on Rangelands
2. Conservation and Maintenance of Plant and Animal Resources on Rangelands
3. Conservation and Maintenance of Soil and Water Resources
4. Maintenance and Enhancement of Multiple Economic and Social Benefits to Current and Future Generations
5. Legal, Institutional and Economic Framework for Rangeland Conservation and Sustainable Management

2. INDICATORS

The following indicators reflect a multitude of aspects relevant to monitoring plant and animal resources. They range from broad-based assessments to detailed accounts for ecological processes from local to national scales. At this point, the indicators have been selected and co-operators are working to populate a matrix with datasets available to provide measurements for each indicator.

2.1 Extent of land area in rangelands

The indicator quantifies amount and trend in the total area of land classified as rangelands for the United States. For our group's purpose, we follow the definition provided by the Society for Range Management: "land on which the vegetation is predominately grasses, grass-like plants, forbs, or shrubs and is managed as a natural ecosystem." Rangelands may include, but are not limited to natural grasslands, savannas, shrublands, deserts, tundra, marshes, meadows, etc.

The indicator is meaningful across multiple scales and incorporates geographic regions throughout the United States containing rangeland systems. If the definition of rangelands does not change, the indicator will provide a monitoring scheme that is applicable across temporal scales. Data for the indicator will be remotely sensed with applicable ground truth tools to provide an accurate representation of the amount of rangelands in the United States.

2.2 Integrity of natural fire regimes on rangelands

Although disturbance regimes vary across rangeland systems, the criterion group agreed that fire is a key ecological driver present on most all rangeland systems. The indicator will measure aspects of fire regimes on rangelands including, but not limited to, frequency, intensity, seasonality, and spatial extent. Changes in fire regime can result from both natural and anthropogenic sources; and monitoring changes are reflective of important ecological shifts that can be tracked from regional to national scales.

Methods and procedures for data collection and reporting as well as data sets of useable quality currently exist at the regional and national scales. It is anticipated that data will be acquired from local, regional and national sources as well as some data being remotely sensed. Standardization of current and future collected data will require the development of protocols, but the consensus is the concept is feasible.

2.3 Extent and condition of riparian systems in rangelands

The indicator will monitor riparian vegetation communities along first to fourth order streams in rangeland systems. Currently, there is limited standardized data available for regional and national monitoring, but the concept is considered feasible. The indicator relates to a system that is linear and maintained by disturbance, so it functions as another measure of disturbance on rangeland systems. Metrics are being developed that include monitoring both quantitative and qualitative variables. As the indicator data matrix is developed, consensus will be sought on the selection of the indicator metric.

2.4 Number & extent of wetlands on rangelands

The indicator will monitor the abundance of wetland systems within rangeland landscapes. For this indicator, wetlands are defined to include depressions and slope wetlands, but do not include riverine or floodplain wetlands that are considered in Indicator 3. The indicator will measure the numbers and total area of wetlands within all or portions of rangeland systems. The metric may be either 1) numbers of individually identifiable wetlands or 2) numbers and percent of landscape occupied by wetlands. Data availability is high, with 90% of the contiguous United States wetlands mapped and 34% of Alaska wetlands. In time all wetlands will be mapped for the United States within the National Wetlands Inventory.

2.5 Rangeland area by community type

The indicator will designate rangeland vegetation communities by type and measure the total area of each designated type. Though variable, community types, if classified and measured by standardized methods, can be monitored across local,

regional and national scales. A limited amount of data is currently available at the regional/national level, but methods and procedures for standardizing the data must be developed across regional/national scales. Efforts for standardizing community types are currently being developed (including SRR) and consensus will be sought upon their conclusion.

2.6 Fragmentation of rangeland by size, pattern and dispersion of rangeland community types

The indicator describes spatial patterns on rangelands and rangeland community types. The indicator will measure the size of contiguous areas, spatial organization, and community type dispersion within classes of rangeland that are important rangeland descriptors in terms of ecological services provided. The indicator will be meaningful across multiple spatial and temporal scales, especially when combined with data from Indicator 5. Limited data exists at regional/national levels, and methods and procedures for standardizing the data must be developed.

2.7 Density of roads and human structures on rangelands

The indicator will measure the density of roads and other human structures and associated grounds as a proxy for intensity of human use. The indicator will be meaningful across multiple spatial and temporal scales and should provide a relative indication of the impacts occurring or possibly occurring in the future. In combination with Indicator 6, the indicators will provide a useful indication as to the rate and extent of fragmentation and human impact on rangeland systems.

2.8 Area of infestation and presence/absence of invasive and non-native species of concern

The indicator will track the area of infestation and presence/absence of invasive and non-native species as defined by Presidential Executive Order 13112. The indicator will provide, over time, trends in the presence of non-native species as an indicator of potential loss of ecological services provided by native species. Multiple national, regional and local data sources are available, but methods of standardizing the data must be developed to incorporate across multiple spatial and temporal scales. Development of the indicator is conceptually feasible for a national scale monitoring system.

2.9 Presence and status of species and communities of concern

The indicator will measure the conservation status of rangeland species and communities, particularly those at risk of not sustaining viable populations. It would measure status of species and communities that are identified as G3 or higher in The Nature Conservancy's Natural Heritage Program, as well as those legally identified as federally endangered or threatened. The indicator would measure metapopulation dynamics and not simply population level assessments of individual species. The metric is meaningful across spatial and temporal scales, and methods and procedures for monitoring the indicator exist at the regional/national level.

2.10 Population levels and geographic ranges of representative species to be monitored across their geographic range

The indicator will measure the population levels and current geographic ranges of selected plant and animal species across their known range. As an example, selected keystone species, may represent sensitivity to known threats. If the selected "representative" species are diverse with respect to habitat, trophic level, ranges, life strategy, etc., monitoring will have a high likelihood of detecting deleterious effects on rangeland ecosystems. Methods and procedures for some species likely to be monitored by the indicator exist at regional and national levels. However, full development of the indicator will require standardizing the monitoring system to include other species not currently available at regional/national levels.

3. CONCLUSIONS

The above suite of indicators was selected to provide an indication of the sustainability of plant and animal resources on rangelands. The goal is to develop a monitoring system that allows interested stakeholders the opportunity to track characteristics of plant and animal resources on rangelands. Through development and evaluation by participating experts, monitoring the above indicators provides the opportunity to track trends on rangelands indicating if trends point toward sustainability. In combination with indicators of the four other indicator criterion groups (Table 2), these represent what the Sustainable Rangeland Roundtable believes will provide national scale monitoring of managements impacts on rangeland sustainability.